CLAIMS

1. A heat exchanger comprising:

a partition type heat transfer material for parting a high temperature fluid and a low temperature fluid from each other, wherein

the heat transfer material is bellows-shaped and is arranged such that both the fluids flow parallel or counter to each other mainly through the gap portion in the bellows section of the heat transfer material along the ridge line or valley line thereof.

2. A self-heat exchange type heat exchanger comprising:

a partition type heat transfer material for parting a high temperature fluid and a low temperature fluid from each other, wherein

the heat transfer material is bellows-shaped and is arranged such that both the fluids flow counter to each other mainly through the gap portion in the bellows section of the heat transfer material along the ridge line or valley line thereof,

the heat transfer material has a fluid forwarding space portion at one or both ends thereof crossing the ridge line of the bellows section for forwarding one of the fluids to the gap portion in the bellows section on the opposite side thereof,

and

the fluid which has been forwarded to the opposite side via the fluid forwarding space portion acts as the other fluid to be heat-exchanged to perform heat exchange.

3. A reactor comprising:

(a) a self-heat exchange type heat exchanger having a partition type heat transfer material for parting a high temperature fluid and a low temperature fluid from each other, wherein

the heat transfer material is bellows-shaped and is arranged such that both the fluids flow counter to each other mainly through the gap portion in the bellows section of the heat transfer material along the ridge line or valley line thereof and the heat transfer material has a fluid forwarding space portion at one or both ends thereof crossing the ridge line of the bellows section for forwarding one of the fluids to the gap portion in the bellows section on the opposite side thereof, and

the fluid which has been forwarded to the opposite side via the fluid forwarding space portion acts as the other fluid to be heat-exchanged to perform heat exchange; and

(b) a heating element or heat-absorbing element provided in the fluid forwarding space portion of the heat exchanger.

4. The reactor as described in Claim 3, wherein

a catalyst which accelerates exothermic reaction is supported on the entire surface of the heat transfer material of the heat exchanger or the surface thereof in the vicinity of the fluid forwarding space portion and as the fluid there is used one including the reactive components.

5. The reactor as described in Claim 3, wherein

as the heat transfer material of the heat exchanger there is used one having heat storage capacities,

a catalyst which accelerates exothermic reaction is supported on the entire surface of the heat transfer material of the heat exchanger or the surface of the region close to the inlet/outlet of the fluid, an adsorbent which adsorbs the reactive components at low temperature and releases the reactive components at high temperature is supported on the entire surface of the heat transfer material of the heat exchanger or the surface thereof in the vicinity of the fluid forwarding space portion and as the fluid there is used one including the reactive components.

6. The reactor as described in Claim 3, further comprising:

a particle removing filter for catching and removing fine particles provided in close contact with the side of the heat

transfer material of the heat exchanger to which the fluid is forwarded.

7. The reactor as described in Claim 4, further comprising:

a particle removing filter for catching and removing fine particles provided in close contact with the side of the heat transfer material of the heat exchanger to which the fluid is forwarded.

8. The reactor as described in Claim 3 or 4, wherein

the heat transfer material includes a filtrating function allowing gas permeation and particle catch, and is not provided with a fluid forwarding space portion through which the fluid is forwarded from one side to the other side of the heat transfer material.

9. A radiation heater comprising:

a self-heat exchange type heat exchanger having a partition type heat transfer material for parting a high temperature fluid and a low temperature fluid from each other, wherein

the heat transfer material is bellows-shaped and is arranged such that both the fluids flow counter to each other mainly through the gap portion in the bellows section of the heat transfer material along the ridge line or valley line

thereof, and

the heat transfer material has a fluid forwarding space portion at one or both ends thereof crossing the ridge line of the bellows section for forwarding one of the fluids to the gap portion in the bellows section on the opposite side thereof, and

the fluid which has been forwarded to the opposite side via the fluid forwarding space portion acts as the other fluid to be heat-exchanged to perform heat exchange; and

(b) a burner disposed in the fluid forwarding space portion of the heat exchanger, wherein

the wall parting the fluid forwarding space portion in which the burner is disposed from the exterior is formed by a heat radiating plate.

10. A radiation heater comprising:

a self-heat exchange type heat exchanger having a partition type heat transfer material for parting a high temperature fluid and a low temperature fluid from each other, wherein

the heat transfer material is bellows-shaped and is arranged such that both the fluids flow counter to each other mainly through the gap portion in the bellows section of the heat transfer material along the ridge line or valley line thereof, and

the heat transfer material has a fluid forwarding space portion at one or both ends thereof crossing the ridge line of the bellows section for forwarding one of the fluids to the gap portion in the bellows section on the opposite side thereof, and

the fluid which has been forwarded to the opposite side via the fluid forwarding space portion acts as the other fluid to be heat-exchanged to perform heat exchange; and

(b) an exothermic reaction-accelerating catalyst supported on the entire surface of the heat transfer material of the heat exchanger or the surface thereof in the vicinity of the fluid forwarding space portion, wherein

the wall parting the fluid forwarding space portion from the exterior is formed by a heat radiating plate and as the fluid there is used one including the reactive components.

11. The self-heat exchange type heat exchanger as described in Claim 2, wherein

at least one air-permeable structure different from the heat transfer material is provided in the gap portion of the bellows section of the heat transfer material.

12. The self-heat exchange type heat exchanger as described in Claim 11, wherein

the air-permeable structure acts as a spacer.

13. The self-heat exchange type heat exchanger as described in Claim 2, further comprising:

a functional material such as catalyst, adsorbent, heat storage material and filter material provided in the gap portion of the bellows section of the heat transfer material.

14. The self-heat exchange type heat exchanger as described in Claim 2, wherein

the surface of the heat transfer material is partly opened to form a fluid forwarding space portion.

15. The self-heat exchange type heat exchanger as described in Claim 14, wherein

the end of the heat transfer material is partly cut away to form a fluid forwarding space portion.

16. The self-heat exchange type heat exchanger as described in Claim 14, wherein

the surface of the heat transfer material is partly provided with one or a plurality of openings which are closed at the circumference thereof to form a fluid forwarding space portion.

17. The self-heat exchange type heat exchanger as described

in Claim 12, wherein

as the heat transfer material there is used one having no air permeability, and

the self-heat exchange type heat exchanger is formed by the heat transfer material, a structure for spacer and a filter cloth in combination.

18. The self-heat exchange type heat exchanger as described in Claim 17, wherein

the structure extends beyond the end of the fluid forwarding space portion of the heat transfer material, and a filter cloth is formed therearound in the form of bellows.

19. The self-heat exchange type heat exchanger as described in Claim 17, wherein

the surface of the heat transfer material is partly opened to form a fluid forwarding space portion, or the end of the heat transfer material is partly cut away to form a fluid forwarding space portion.

20. The reactor as described in Claim 8, wherein

the heat transfer material having a filtrating function is retained and formed in the form of a structure for spacer in the form of bellows.